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METHOD OF DETERMINING MOISTURE CONTENT OF ASPHALT MIXTURES OR MINERAL AGGREGATE USING MICROWAVE OVENS

CAUTION: Prior to handling test materials, performing equipment setups, and/or conducting this method, testers are required to read "**SAFETY AND HEALTH**" in Section G of this method. It is the responsibility of the user of this method to consult and use departmental safety and health practices and determine the applicability of regulatory limitations before any testing is performed.

A. SCOPE

This method provides a procedure for determining the amount of moisture in either asphaltic mixtures or graded mineral aggregates used in asphaltic mixtures. Its primary purpose is to provide a rapid field test to permit production control of asphalt concrete.

Its use on asphalt mixtures is limited to those using paving grades of asphalt. Emulsions or liquid asphalt grades may yield erroneous results.

B. APPARATUS

1. Microwave oven capable of testing 4000 g sample.
2. Sample containers capable of holding 600 g (must be paper, glass, or ceramic).
3. Balance - 1000 g capacity, 0.1 g accuracy.
4. Riffle splitter - 25.4 mm wide riffles.
5. Spatula - approximately 25 mm wide and 250 mm long.
6. Heat resistant gloves.
7. Metal concrete cylinder cans complete with lids. Approximate dimensions are 150 mm diameter by 305 mm length.
8. Tape for sealing cans.
9. Fluorescent tube F4T5/CW (Westinghouse) or equivalent.

C. TEST RECORD FORM

Use any appropriate form – indicate California Test 370.

D. SAMPLE PREPARATION

1. Obtain approximately 2000 g of either mineral aggregate or asphaltic mix.
2. Using the riffle splitter, split the material to obtain two 500 ± 50 g samples.

E. TESTS AND CALCULATIONS

1. Place the samples on tared paper plates or glass containers, and weigh to the nearest 0.1 g.
2. Put the samples in the microwave oven, set the timer for 5 min and start the oven.

3. After 5 min, remove and cool samples at room temperature for 15 min, and weigh the samples to the nearest 0.1 g, and record the values.

4. Place samples back in the oven. Turn the oven on, and dry the samples for five more minutes.

5. Remove the samples from the oven, cool, weigh to the closest 0.1 g, and record values.

6. Continue to heat the samples for 2 min and weigh until a constant mass is obtained.

   In most cases with moisture contents of 1.0 % or less, a 10-min drying period is sufficient.

7. After a constant mass has been obtained, calculate the moisture content of the samples as follows:

   % moisture = [(original mass) - (final mass)] / (final mass)

8. If the moisture contents of the two samples differ by more than 0.4 %, the test is invalid. In this case, new samples must be prepared and the test rerun.

9. Record the moisture content as the average of the two samples.

F. PRECAUTIONS

1. Do not use metal containers in oven at any time. Damage to the oven will occur.

2. Do not delay obtaining mass after sampling. (If a delay of 15 min or more is anticipated, samples must be placed into and kept in sealed containers. For reliable results, all samples should be tested within 1 hour of sampling.)

G. SAFETY AND HEALTH

Personnel should use heat resistant gloves when working with hot materials. Use proper lifting techniques when handling bags of aggregate. Reasonable care should be exercised to avoid being burned by hot asphalt, aggregate or equipment.

Check the microwave oven daily for leakage by passing the small fluorescent tube around the entire outside surface with the oven on (keep tube 25 mm or less from the surface). Any lighting of the tube indicates leakage. The oven should not be used until this leakage is corrected.

Prior to handling, testing or disposing of any waste materials, testers are required to read: Part A (Section 5.0), Part B (Sections: 5.0, 6.0 and 10.0) and Part C (Section 1.0) of Caltrans Laboratory Safety Manual. Users of this method do so at their own risk.

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